Public Health
Seattle & King County Fact Sheet

Botulism: Information for Health Care Providers

❑ Epidemiology

- ✓ Botulism is a neuroparalytic disease caused by botulinum toxin.
- ✓ Spores are present in soil and may be found on agricultural products.
- ✓ Exposure to preformed toxin may occur through ingestion, inhalation, or breaks in the skin.
- ✓ Infant botulism is the most common form.
  - ♦ About 100 cases are reported annually to CDC.
  - ♦ Most of the time, the source is unknown.
  - ♦ Honey can be a source of botulism and should not be fed to infants.
- ✓ Toxins formed when foods are inadequately heated during canning can cause food-borne botulism.
  - ♦ Poorly prepared, home canned vegetables ("low-acid" vegetables such as beans, carrots, peppers, and corn) and fruits are the most common source.
  - ♦ The incubation period is 12 to 72 hours.
- ✓ Contamination of devitalized tissue causes wound botulism (rare).
  - ♦ May be a complication of injection drug use (particularly black tar heroin) or injury.
  - ♦ The incubation period is four to 14 days.

❑ Microbiology and Pathogenesis

- ✓ *Clostridium botulinum* is a gram-positive, spore-forming, anaerobic bacillus.
- ✓ Vegetative cells germinate from spores under anaerobic conditions and produce botulinum toxins.
- ✓ Toxins can be inactivated by heating (>85°C for 5 minutes).
- ✓ Spores are very resistant to harsh environments and may survive boiling for up to three to four hours.
- ✓ Toxins are inactivated in fresh water within three to six days, and inactivated within 20 minutes by standard potable water treatment (e.g., chlorination and aeration).
- ✓ Botulinum toxins act by irreversably binding to the neuromuscular junction, preventing the release of acetylcholine and muscle contraction.
- ✓ Seven antigenically distinct toxin types (A, B, C, D, E, F, G) exist; the majority of naturally occurring disease in humans is caused by types A, B, and E.

Botulism and Bioterrorism

- ✓ Aerosolization of toxin and sabotage of the food supply are thought to be the most likely modes of dissemination of botulinum toxin in a biological attack.
  - ♦ Gastrointestinal symptoms are thought to result from other bacterial metabolites in food and thus may not be present if a purified form of the toxin is used.
- ✓ Inhaling aerosolized spores would produce inhalational botulism - a form that does not occur naturally; the incubation period is likely to be less than that for food-borne illness.

❑ Clinical Presentation

- ✓ The classic syndrome is characterized by:
  - ♦ acute, descending, symmetrical paralysis with prominent bulbar palsies.
  - ♦ afebrile patient.
  - ♦ clear sensorium (i.e., normal mental status; toxin does not cross the blood-brain barrier).
  - ♦ normal sensation (with the exception of paresthesias secondary to anxiety).
- ✓ Disease typically begins with cranial nerve dysfunction, progressing to proximal muscle weakness.
- ✓ Prominent neurologic findings in all forms of botulism include ptosis, diplopia, blurred vision, enlarged or sluggishly reactive pupils, dysarthria, xerostomia, dysphonia, dysphagia, and dystonia.
- ✓ In severe cases, complete flaccid paralysis involving pharyngeal or respiratory muscles develops, requiring ventilatory support.
- ✓ Abdominal cramps, nausea, vomiting, or diarrhea may accompany the food-borne form.
- ✓ In infants, illness may begin with constipation and poor feeding, followed by neuromuscular paralysis, hypotonia, or weakness within two hours to eight days after exposure.

❑ Infection Control

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- ✓ Botulism is not spread person-to-person; standard precautions are adequate.

❑ Diagnosis

- ✓ Differential diagnosis includes Guillain-Barre syndrome, tick paralysis, myasthenia gravis, Lambert-Eaton syndrome, stroke or CNS mass, paralytic shellfish poisoning, poliomyletis, aminoglycoside and belladonna toxicity.
- ✓ Electromyogram (EMG) findings are non-specific but may be helpful in differentiating from other causes of flaccid paralysis.
- ✓ Diagnosis is confirmed by mouse bioassay, available through public health labs for reported suspect cases.
- ✓ Serum, wound exudate or tissue, stool, and gastric secretions are appropriate specimens for laboratory testing.
- ✓ For suspected food-borne illness cases, samples of the suspected food should also be obtained for testing.
- ✓ Contact Public Health – Seattle & King County for assistance with submission of specimens for botulism testing.

❑ Treatment

- ✓ Ventilatory assistance and other supportive care is the mainstay of treatment.
- ✓ In wound botulism, the wound should be surgically debrided and antibiotics administered.
- ✓ Aminoglycosides and clindamycin exacerbate the neuromuscular blockade and are contraindicated.
- ✓ Recovery depends on regeneration of new motor axons and may take weeks to months.
- ✓ Botulism antitoxin is most effective if given early in the clinical course. Antitoxin will not reverse existing paralysis, but will prevent additional nerve damage if given before all circulating toxin is bound to the neuromuscular junction.
  - ♦ Types A, B, and E antitoxin are available from CDC via local and state health departments.
  - ♦ Antitoxin should be requested from Public Health as soon as botulism is suspected.
  - ♦ Antitoxin should be given as early as possible, and is most effective if given within 24 hours of symptom onset.
  - ♦ Screening for hypersensitivity is necessary prior to administration.
  - ♦ For treatment of infant botulism caused, human-derived botulism antitoxin is available through the California Department of Health Services (510) 231-7600.

❑ Prevention and Prophylaxis

- ✓ Preventive measures for avoiding exposure to botulinum toxin include following proper home canning techniques and avoiding food from damaged cans (i.e., slits, holes, dents or bulges).

❑ Web Resources

- ✓ Centers for Disease Control and Prevention: http://www.bt.cdc.gov
- ✓ Public Health – Seattle & King County: http://www.metrokc.gov
- ✓ Infectious Disease Society of America: http://www.idsociety.org
- ✓ Bioterrorism preparedness training modules: http://healthlinks.washington.edu/nwcphp/bttrain/
- ✓ Washington Department of Health: http://www.doh.wa.gov
- ✓ California Department of Health Services Infant Botulism Treatment & Prevention Program: http://www.dhs.ca.gov/ps/dcdc/InfantBot/ibtindex.htm

Report all suspected cases of botulism immediately to Public Health – Seattle & King County by calling (206) 296-4774.

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